ConsumerReports® BEST BUY DRUGS[™]

Evaluating statin drugs to treat:

High Cholesterol and Heart Disease

COMPARING EFFECTIVENESS, SAFETY, AND PRICE



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	recommendations
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Our recommendations

Statin medications lower cholesterol levels in your blood. This can reduce the chance of a heart attack and premature death in people who have an elevated risk of developing heart disease, or who already have it.

Statins work by blocking a liver enzyme needed to make cholesterol. The body needs some cholesterol to maintain good health. High blood levels of LDL cholesterol ("bad cholesterol") and low levels of HDL cholesterol ("good cholesterol") are associated with an increased risk of arterial blockage throughout the body, which could eventually lead to heart attack, stroke, and peripheral artery disease in the legs.

Statins may also moderately reduce triglyceride levels, decrease inflammation in arteries, and help raise HDL levels.

There are seven statin drugs, but they're not all the same. Some statins are backed by stronger evidence than others that they reduce the risk of a heart attack or death from heart disease or a stroke.

Our recommendations about who should consider a statin drug to lower their cardiovascular risks are based in part on new guidelines from the American College of Cardiology (ACC) and the American Heart Association (AHA). Previous strategies focused mainly on reducing elevated LDL cholesterol to very low levels. But the new guidelines consider your overall risk of a heart attack or stroke in the next 10 years more important than just LDL cholesterol levels alone. The guidelines determine your risk based on additional factors, including your age, blood pressure level, whether you smoke, are overweight, or have diabetes or other medical problems.

Diet and lifestyle changes, such as quitting smoking, losing weight if you need to, and exercise, can help lower your risk of heart attack and stroke. Regardless of whether you take a statin or not, you should still follow them.

For the purposes of this report, we define "highintensity" statins as those that will reduce cholesterol by 50 percent or more. Statins that are considered "moderate-intensity" are defined as those that will reduce cholesterol by 30 to 50 percent.

The new guidelines recommend the following people consider a *high-intensity statin*:

- Anyone with a very high LDL cholesterol level—190 mg/dL or greater.
- People who have diabetes and are between 40 to 75 years old and have a high risk of heart attack and stroke—greater than 7.5 percent over the next 10 years.
- People under the age of 75 with a history of heart disease or heart problems.

People who should consider a *moderate-intensity statin*:

People between 40 to 75 years old with an LDL level below 190 mg/dL but who have a high risk of heart attack or stroke of 7.5 percent or greater over the next 10 years.

Note: Our medical advisers say that if you fall into this category, you should consider a statin, but for some people, especially those with a 10-year risk less than 10 percent, diet and lifestyle changes should be the first step—those changes could lower your risk enough that you are no longer considered a candidate for a statin.

Our recommendations

- Older than 75 with a history of heart disease or heart problems.
- At an increased risk of side effects from a high dose statin—this includes:
 - People older than 75, those with multiple and/ or serious medical conditions, such as impaired kidney or liver function, or a history of stroke or muscle disorders.
 - People who currently use medications that could interact with statins.
 - People of Asian heritage.

Statins can vary widely in cost—from as little as \$36 per month to more than \$600. Most people who take a statin must continue to do so for years—perhaps for the rest of their life—so the cost can be an important factor to consider.

Certain generic statins can cost as little as \$4 for a month's supply through discount generic programs run by major chain stores, such as Kroger, Sam's Club, Target, and Walmart. For an even better bargain, you can buy a three-month supply for \$10 through these programs. See the price chart on page 12 for which generic statins are likely available.

Taking the evidence for effectiveness, safety, and cost into account, we have chosen the following statins as *Consumer Reports Best Buy Drugs*:

For people who need *a moderate-intensity statin*:

- Generic atorvastatin 10 mg or 20 mg
- Generic lovastatin 40 mg
- Generic pravastatin 40 mg
- Generic simvastatin 20 mg or 40 mg

For people who need *a high-intensity statin*:

Generic atorvastatin 40 mg or 80 mg

All of our *Best Buys*—atorvastatin, lovastatin, pravastatin, and simvastatin—have been shown to reduce the risk of heart attack and deaths from heart attacks, and are available as inexpensive generics. You could save more than \$100 per month if you pay outof-pocket, and you opt for a generic instead of a brand name statin.

Higher doses and high-intensity statins pose a greater risk of rare, but serious side effects, such as muscle breakdown that can lead to permanent kidney damage, coma, and possibly death.

But some people—such as those who have very high LDL, have suffered a heart attack, or have diabetes may require a *high-intensity statin*. No matter which statin or dose you take, if you experience muscle aches and pains when taking a statin, contact your doctor immediately.

To save money, ask your doctor about splitting your statin pills. This can cut your costs substantially and is a widely accepted practice.

This report was updated in March 2014.

Welcome

Cholesterol-lowering statins are used to help prevent heart disease, which can lead to heart attacks, heart failure, and death. Heart disease is the leading cause of death in the U.S., accounting for about 600,000 deaths every year, according to the Centers for Disease Control and Prevention (CDC).

About 71 million American adults have elevated levels of LDL or "bad" cholesterol, according to the CDC. A high LDL cholesterol level increases your risk of heart disease, but it does not necessarily mean you should start on a statin, because LDL is just one risk factor out of several that determines your overall risk. Other factors that raise your risk of heart disease include older age, diabetes, having a family history of heart disease, high blood pressure, lack of exercise, whether you are obese, and whether you smoke. Your doctor should ask you about those risk factors and take them into consideration before deciding whether a statin is appropriate for you.

The use of statins has increased sharply in recent years, and they are now among the most widely prescribed medicines in the U.S. Twenty-two percent of Americans 45 years and older take a statin drug, according to the most recent data from the National Health and Nutrition Examination Survey (NHANES).

As a class, statins and their related combination products generated \$16.9 billion in U.S. sales in 2012. One statin, Crestor (rosuvastatin), was the third topselling drug in the U.S., accounting for \$5.1 billion.

This report compares statin drugs with each other and will help you talk with your doctor about your choices

WHO SHOULD GET A CHOLESTEROL TEST?

The U.S. Preventive Services Task Force (USPSTF) recommends cholesterol screening for the following:

- All men 35 and older.
- Men and women over age 20 with other risk factors, such as diabetes, obesity, or smoking.
- For men ages 20 to 35 and women 20 or older who do not have other risk factors for heart disease, it's up to the individual whether to get their cholesterol levels checked. The USPSTF finds that the balance of benefits and harms of treatment are too close to make a blanket recommendation for everyone in this category.

Your doctor will measure your cholesterol levels with a blood test, called a lipid panel. That test should include measures of your **Total Cholesterol** (TC) and **HDL**, which stands for "high-density lipoprotein." HDL is often called the "good" cholesterol because it helps ferry cholesterol away from your blood vessels. Another important type of cholesterol is called **LDL**, which stands for "low-density lipoprotein." LDL is often referred to as the "bad" cholesterol because it can build up on the walls of your blood vessels and increase your risk of heart disease.

and heart-disease risk. It is part of a Consumer Reports project to help you find safe, effective medicines that give you the most value for your healthcare dollar. To learn more about the project and other drugs we have evaluated, and to get cost updates, go to www.CRBestBuyDrugs.org.

Who should take a statin drug?

The increase in statin prescriptions has prompted controversy over the appropriate use of the drugs. Some doctors and public-health advocates are

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concerned that too many people are being put on a statin before trying to lower their LDL cholesterol through diet and lifestyle changes.

Some people—such as those with an LDL level greater than 190 mg/dL, those who have heart disease or have previously suffered a heart attack or stroke, and those with diabetes who have a high risk of heart attack or stroke—should start taking a statin as initial therapy.

But for people who don't fall into those categories and have a 10-year risk of heart attack and stroke that is below 7.5 percent, our medical advisers say that you should not consider a statin, unless you have a genetic condition that causes elevated cholesterol levels or a strong family history of premature heart disease.

If your risk is at or above 7.5 percent but below 10 percent, you could consider a statin, but don't underestimate the benefit diet and lifestyle changes can have. For example, regular aerobic exercise has been shown to lower LDL and raise HDL levels, as well as help you lose weight, which is also associated with a reduction in LDL and a rise in HDL levels. Those changes could lower your risk enough that you are no longer considered a candidate for a statin.

Even after years of attention to this issue, many people remain confused about what constitutes a cholesterollowering and heart-healthy diet. For example, many still believe that simply cutting cholesterol-laden eggs out of their diet will do the trick. It won't if the rest of your diet is high in saturated fats from meat, margarine, butter, and other high-fat dairy products. Following a Mediterranean diet supplemented with olive oil or nuts is the only diet that has been shown in a clinical trial to reduce the risk of heart attacks and strokes. To learn more about a healthy diet, go to Consumer Reports heart health site at: http://www. consumerreports.org/cro/2013/02/eat-a-heart-healthydiet/index.htm.

Drugs evaluated in this report

Seven statins are now available by prescription in the U.S. They are:

Generic Name	Brand name(s)	Available as a generic drug?
Atorvastatin	Lipitor	Yes
Fluvastatin	Lescol, Lescol XL	Yes (Lescol only, not Lescol XL)
Lovastatin	Altoprev	Yes
Pitavastatin	Livalo	No
Pravastatin	Pravachol	Yes
Simvastatin	Zocor	Yes
Rosuvastatin	Crestor	No

In addition, combination products containing a statin and another lipid-lowering drug are available in the U.S. These four drugs are listed below.

Generic Name	Brand Name
Atorvastatin/Ezetimibe	Liptruzet
Lovastatin + Niacin	Advicor
Simvastatin/Ezetimibe	Vytorin
Simvastatin/Niacin-ER	Simcor

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SKIP LIPTRUZET, VYTORIN, AND ZETIA

Since the new guidelines focus on preventing heart attacks and strokes—not LDL lowering—there is no longer any reason to take Liptruzet, Vytorin, or Zetia.

Zetia (ezetimibe) is a different type of cholesterollowering medication than a statin. It decreases cholesterol absorption in the intestines. But it has not been shown to reduce heart attacks or strokes.

Vytorin combines simvastatin with ezetimibe in a single pill. Liptruzet is a combination of atorvastatin and ezetimibe. But there is no evidence that either Liptruzet or Vytorin works better than the statin alone to prevent heart attacks or strokes.

Two studies cast doubt on the benefits of Vytorin. The first was a two-year study that showed Vytorin was no better than simvastatin alone in reducing plaque buildup in arteries. The second was a five-year study that showed Vytorin did not reduce heart attacks or strokes compared to a placebo.

Merck, the manufacturer of Liptruzet, says the combo medication has not been proven to reduce the risk of heart attacks or strokes more than atorvastatin alone.

Ezetimibe (Zetia) has racked up more than \$1.1 billion in sales, but our medical advisers recommend skipping it and combination medications that contain it, such as Liptruzet and Vytorin (See box).

Simcor, an extended-release combination of simvastatin and niacin, has been associated with an increase in adverse events that cause people to stop taking the drug compared with those who took simvastatin alone. There is another combination tablet available that contains both a statin and a drug used for treating high blood pressure for people who have both conditions. The brand name of that drug, which we do not evaluate in this report, is Caduet. It is a combination of the calcium channel blocker amlodipine (Norvasc and generic) and atorvastatin (Lipitor and generic).

This report was updated in March 2014.



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Who should take a statin drug?

Our recommendations about who should consider a statin drug are based in part on guidelines from the American College of Cardiology (ACC) and the American Heart Association (AHA) released in 2013. Those guidelines recommend your doctor prescribe either a *moderate-* or *high-intensity statin* if you fall into one of four groups below. A *moderate-intensity statin* is expected to reduce LDL cholesterol by 30 to 50 percent, while a *high-intensity statin* would reduce LDL by 50 percent or more. (See Table 1). Previous strategies focused on reducing elevated LDL cholesterol levels to very low levels. But the new guidelines look at your overall risk of a heart attack or stroke in the next 10 years as more important than just LDL cholesterol levels alone.

Table 1, below, lists the four groups of people the new guidelines recommend should receive a statin.

Table 1. Statin benefit groups and recommendations							
Gro	oup	Our Recommendations					
1.	This group includes anybody who has one of the following:	People in this group who are under the age of 75 should take a high-intensity statin*					
	 History of heart disease or heart problems Have had a heart attack, stroke or near-stroke (transient ischemic attack) or had a coronary stent inserted People with angina or peripheral artery disease 	People over 75 years should take a moderate-intensity statin					
2.	People with LDL level of 190 mg/dL or greater	Take a high-intensity statin*					
3.	 You're in this group if you meet all of the following: Between 40 to 75 years of age with diabetes but without heart disease LDL level is 70 to 189 mg/dL 	If your 10-year risk of heart attack/stroke is less than 7.5 percent, guidelines recommend a moderate-intensity statin If your 10-year risk of heart attack/stroke is greater than 7.5 percent, guidelines recommend a high-intensity statin					
4.	 You're in this group if you meet all of the following: Between 40 to 75 years old Your LDL level is 70 to 189 mg/dL Do not have diabetes or heart disease Your 10-year heart attack/stroke risk is 7.5 percent or higher 	Take a moderate- to high-intensity statin.* For some individuals, especially those with a 10-year heart attack/ stroke risk less than 10 percent, our experts say diet and lifestyle changes could be the first step—and could lower your risk enough that you don't need a statin					

 Table 1. Statin benefit groups and recommendations

* People who are at high risk for side effects from a high-intensity statin should instead take a moderate-intensity statin. This includes people who have multiple and/or serious medical conditions, including impaired kidney or liver function, a history of stroke, muscle disorders or problems with statins, use of medications that could interact with statins, older than 75, and Asian heritage.

Who should take a statin drug?

To estimate your risk of suffering a heart attack or stroke over the next decade, the new guidelines use a calculator, found here: http://tools.cardiosource. org/ASCVD-Risk-Estimator/. It uses your age, blood pressure, gender, levels of total and HDL cholesterol, race, and whether you smoke or have diabetes to generate a risk score.

This calculator generated controversy when it was released in November 2013. Some experts argued it might overestimate a person's risk, and could put people on a statin who don't actually need one.

It's good to know that the calculator is intended to help estimate your overall cardiovascular risk. The results are simply a guide for you and your doctor to use in deciding if you should take a statin.

The fourth group—those without heart problems or diabetes and a 10-year heart attack/stroke risk higher than 7.5 percent—is controversial because some experts think the 7.5 percent cutoff is too low. Some say it should be as high as 20 percent while others think it should be 10 percent. As noted above, the new guidelines recommend that people in this group consider a statin. For some individuals, especially those with a 10-year heart attack/stroke risk less than 10 percent, our medical advisers say diet and lifestyle changes could be the first step. Adopting a healthy diet that is low in saturated fats, trans fats, and cholesterol, and making lifestyle changes such as exercising and losing weight if you need to or quitting smoking if you are a smoker. These changes might reduce your LDL and your heart attack/stroke risk enough that you won't need to take a statin.

It's also important to discuss with your doctor your individual risk factors—cholesterol level, age, family history of heart disease, exercise level, and whether you have diabetes, high blood pressure, are overweight or obese, or smoke—to help determine whether a statin makes sense in your situation. In making your decision, our medical advisers recommend that you

C-REACTIVE PROTEIN: SHOULD YOU BE TESTED?

Our medical advisers agree with the guidelines from the American College of Cardiology and the American Heart Association that it's not necessary for people to have their C-reactive protein (CRP) level tested routinely. But there are situations where knowing your CRP level can help. For example, if your 10-year risk of heart attack or stroke is close to 7.5%, it's uncertain if you're a clear candidate for a statin. In that case, evaluating your other risk factors, such as your CRP level, might help you and your doctor decide whether a statin makes sense for you.

consider the risk of side effects and also look at how taking a statin will reduce your risk. You might find that taking a statin will not make much difference in your 10-year risk.

If you're in the first, second, or third groups, studies indicate that the benefits of a statin outweigh the risk of side effects, so you should start on a *moderate-* or *high-intensity statin*—whichever is appropriate for your situation (**See Table 1**). But you should still modify your diet and adopt healthy lifestyle changes.

You are in the first group if you have been diagnosed with heart disease or you have suffered a heart attack, stroke or near-stroke—sometimes called a transient ischemic attack. Those who have had a coronary stent implanted also fall into this group. It also includes people with stable or unstable angina, or peripheral artery disease—pain in the legs due to poor circulation that is brought on by walking and relieved by rest.

If your doctor advises the use of a statin, you face a decision about which one and at what dose. This decision has become more important in recent years as evidence has mounted that (a) the statins differ in their potency and (b) the effectiveness and potential

Who should take a statin drug?

A NOTE ABOUT CONTINUING TO TAKE YOUR MEDICATIONS

Many people find it difficult to take their statins consistently over the long-term. Studies indicate that only about half of the people prescribed one of these drugs still take it after six months. After one year, the percentage of people still taking their medicine drops to only 30 to 40 percent.

This is a concern because statins must be taken continuously over years and probably for the rest of a person's life. Studies have found that people give a variety of reasons for stopping their medication, including cost, forgetfulness, fear of side effects, and the belief that they're not sick enough to need to take a drug.

No one strategy works for everybody, but if you find it difficult to continue to take your medication, ask your doctor or pharmacist for suggestions about how you can improve your adherence.

harmful effects of statins increase with the use of larger doses. For some people, however, aggressively lowering LDL cholesterol ("high-intensity" statin treatment) may be needed to lower their risk of heart attack and stroke more substantially. The next section discusses the differences in statins and gives our *Best Buy* picks depending on your health circumstances.

All the statins have been found to reduce levels of LDL cholesterol. And all but two have been found to lower the risk of heart attack and death from heart disease in people with moderate to high risk of heart disease and those who have heart disease or have had a heart attack. But statins differ in their ability to reduce LDL cholesterol. And the evidence is stronger for certain statins when it comes to reducing your risk of heart attack or death from heart disease or stroke.

Statins also vary widely in cost. As mentioned, five are now available as generics, and you can save a significant amount of money if you and your doctor choose one of them. This may also help you stay on the drug.

Be sure to check prices at online pharmacies and large discount stores, too. Those outlets often have significantly lower prices. Other options include discount generic programs offered by large chains, such as CVS, Target, Walgreens, and Wal-Mart, where a 30-day supply of certain generic statins can cost just \$4, and some offer a three-month's supply for just \$10. We note in the price charts which statins are likely available through these programs. Splitting pills can also save you money. We discuss that in more detail below.

Of course, price is not the only important factor in choosing a statin. As we previously discussed, you and your doctor will want to consider:

- Your risk factors for heart disease, heart attack, and stroke.
- The strength of evidence for each statin.
- The possibility of drug interactions with medicines you are already taking.

Our recommendations focus on the four groups of people who can benefit from statins, according to the ACC/AHA guidelines:

- 1. People who have a history of heart disease or heart problems.
- Those who have a very high LDL level of 190 mg/ dL or greater.
- 3. Those who have diabetes, a LDL level below 190 mg/dl, and do not have heart disease.
- 4. Those between 40 to 75 years old, an LDL between 70 to 189 mg/dL, do not have diabetes or heart disease, and have a 10-year heart attack/stroke risk of 7.5 percent or higher.

If you fall in one of those groups and you and your doctor have decided a *moderate-intensity statin* is appropriate, we choose the following as *Best Buys*, based on effectiveness, safety, and cost:

- Generic atorvastatin 10 mg or 20 mg
- Generic lovastatin 40 mg
- Generic pravastatin 40 mg
- Generic simvastatin 20 mg or 40 mg

WHAT ABOUT LOW-INTENSITY STATINS?

If you are already taking a low-intensity statin, such as simvastatin 10 mg, pravastatin 10 mg or 20 mg, lovastatin 20 mg, fluvastatin 20 mg or 40 mg, or pitavastatin 1 mg, the new guidelines do not mean that you should necessarily switch to a moderate- or high-intensity statin. This could be a good time to review your risk factors with your doctor to figure out your current risk level and determine whether or not it makes sense to change to a different statin. But if you and your doctor are satisfied that the low-intensity statin you are on is working for you, there's no reason to switch.

For people who need a *high-intensity statin*, we selected the following as a *Best Buy*:

Generic atorvastatin 40 mg or 80 mg

All of our *Best Buys*—atorvastatin, lovastatin, pravastatin and simvastatin—have been shown to reduce the risk of heart attack and deaths from heart attacks, and they are all available as inexpensive generics. You could save more than \$100 per month if you pay out-of-pocket and you opt for a generic instead of a brand-name statin.

If you currently take one of the *high-intensity statins* Crestor or Lipitor, but you don't meet the ACC/AHA's criteria for such a potent statin, a switch to one of our *moderate-intensity Best Buy statins* could save you thousands of dollars over the many years you may have to take a statin. For example, for people with health insurance plans that require a co-pay of \$25 for a brand-name drug, such as Crestor, vs. a \$7 co-pay for generic simvastatin, that represents an \$18 difference, which amounts to a savings of \$216 per year, or \$1,080 over 5 years. For people who are without health insurance or adequate drug coverage, the savings would be much more. Talk to your doctor about whether switching makes sense in your case.

If you have had a heart attack

People who have already suffered from a heart attack are at very high risk of another (possibly fatal) heart attack and generally benefit from lowering their LDL cholesterol as much as possible.

People who have had a heart attack will probably be prescribed several different kinds of drugs, including a statin, and lifestyle changes will be strongly urged. In studies involving heart patients, atorvastatin has been shown to reduce the risk of second heart attacks and deaths, strokes and major heart problems. In addition, atorvastatin may be a better option for people who have had a heart attack and need greater LDL reduction.

Strokes

Several statins—atorvastatin, pravastatin, simvastatin, and rosuvastatin (Crestor)—have been proven to prevent strokes. The statins are also widely prescribed for people who have had a stroke or "ministroke," which doctors call a transient ischemic attack, or TIA. A recent analysis by the Cochrane Collaboration found that the available evidence indicates overall that statins reduce the risk of fatal and non-fatal strokes by 22 percent.

What about the other statins?

The remaining statins include fluvastatin (Lescol and Lescol XL), pitavastatin (Livalo), and rosuvastatin (Crestor). Fluvastatin and pitavastatin have not been clearly proven to reduce heart attacks, strokes, or deaths. Crestor has been shown to reduce heart attacks and deaths, but there is no reason to take it instead of generic atorvastatin, which is about half the price, depending on dose.

Table 2. Choices for People Who Need a Moderate-Intensity Statin

Note: If the price box contains a [3], that indicates the dose of that drug is likely available for a low monthly cost through programs offered by large chain stores. For example, Kroger, Sam's Club, Target, and Walmart offer a month's supply of selected generic drugs for \$4 or a three-month supply for \$10. Other chain stores, such as Costco, CVS, Kmart, and Walgreens, offer similar programs. Some programs have restrictions or membership fees, so check the details carefully for restrictions and to make sure your drug is covered.

	Generic Name And Dose Per Day	Brand Name ¹	Average Monthly Cost ²	Average Expected LDL Reduction	Reduces Risk of Heart Attack? ³	Reduces risk of death from heart disease?
	Atorvastatin				Yes	Yes
BEST BUY	Atorvastatin tablet 10 mg	Generic	\$68	34-38%		
	Atorvastatin tablet 10 mg	Lipitor	\$175	34-38%		
BEST BUY	Atorvastatin tablet 20 mg	Generic	\$100	42-46%		
	Atorvastatin tablet 20 mg	Lipitor	\$254	42-46%		
	Fluvastatin				Likely	Likely
	Fluvastatin capsule 40 mg (2 pills per day)	Generic	\$235	25%		
	Fluvastatin capsule 40 mg (2 pills per day)	Lescol	\$347	25%		
	Fluvastatin sustained-release tablet 80 mg	Lescol XL	\$217	35%		
	Lovastatin				Yes	Likely ⁴
BEST BUY	Lovastatin tablet 40 mg	Generic	\$67 🔳	31%		
	Lovastatin sustained-release tablet 40 mg	Altoprev	\$652	31%		
	Pitavastatin				Unknown	Unknown
	Pitavastatin tablet 2 mg	Livalo	\$173	28-40%		
	Pitavastatin tablet 4 mg	Livalo	\$170	41-45%		
	Pravastatin				Yes	Yes
BEST BUY	Pravastatin tablet 40 mg	Generic	\$36 💲	26-34%		
	Pravastatin tablet 40 mg	Pravachol	\$205	26-34%		
	Pravastatin tablet 80 mg	Generic	\$67 🔳	37%		
	Pravastatin tablet 80 mg	Pravachol	\$203	37%		

Table 2. Choices for People Who Need a Moderate-Intensity Statin (continued)

Note: If the price box contains a **S**, that indicates the dose of that drug is likely available for a low monthly cost through programs offered by large chain stores. For example, Kroger, Sam's Club, Target, and Walmart offer a month's supply of selected generic drugs for \$4 or a three-month supply for \$10. Other chain stores, such as Costco, CVS, Kmart, and Walgreens, offer similar programs. Some programs have restrictions or membership fees, so check the details carefully for restrictions and to make sure your drug is covered.

	Generic Name And Dose Per Day	Brand Name ¹	Monthly	Average Expected LDL Reduction	Reduces Risk of Heart Attack? ³	Reduces risk of death from heart disease?
	Rosuvastatin				Yes	Likely
	Rosuvastatin tablet 5 mg	Crestor	\$205	39%-46%		
	Rosuvastatin tablet 10 mg	Crestor	\$201	39%-46%		
	Simvastatin				Yes	Yes
EST JY	Simvastatin tablet 20 mg	Generic	\$71 🚺	30%- 40%		
	Simvastatin tablet 20 mg	Zocor	\$229	30%- 40%		
EST JY	Simvastatin tablet 40 mg	Generic	\$68 🔰	35%- 45%		
	Simvastatin tablet 40 mg	Zocor	\$234	35%- 45%		
	Simvastatin tablet 80 mg	Zocor or generic		d unsafe. Do not t a year or longer. S	· · · · ·	ave already been

1. "Generic" indicates a drug sold by generic name.

 Prices reflect nationwide retail average for January 2014, rounded to nearest dollar. Information derived by *Consumer Reports Best Buy* Drugs from data provided by Symphony Health Solutions, which is not involved in our analysis or recommendations.

3. Nonfatal and fatal heart attack plus deaths attributed to heart disease.

4. Lovastatin has not been proven to reduce deaths but the evidence strongly points in that direction.

	Table 3. Choices for People Who Need a High-Intensity Statin					
	Generic Name And Dose Per Day	Brand Name ¹	Average Monthly Cost ²	_	Reduces Risk of Heart Attack? ³	Reduces risk of death from heart disease?
	Atorvastatin				Yes	Yes
est Uy	Atorvastatin tablet 40 mg	Generic	\$105	47%-51%		
	Atorvastatin tablet 40 mg	Lipitor	\$264	47%-51%		
EST UY	Atorvastatin tablet 80 mg	Generic	\$100	46%-54%		
	Atorvastatin tablet 80 mg	Lipitor	\$261	46%-54%		
	Rosuvastatin				Yes	Likely
	Rosuvastatin tablet 20 mg	Crestor	\$207	52%-55%		
	Rosuvastatin tablet 40 mg	Crestor	\$203	55%-60%		

1. "Generic" indicates a drug sold by generic name.

2. Prices reflect nationwide retail average for January 2014, rounded to nearest dollar. Information derived by Consumer Reports Best Buy

Drugs from data provided by Symphony Health Solutions, which is not involved in our analysis or recommendations.

3. Nonfatal and fatal heart attack plus deaths attributed to heart disease.

Warning about high doses

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There is one other important issue you should know about as you and your doctor choose a statin. For people who are at high risk of heart attack-for example, if you have diabetes, are a smoker, and have elevated LDL levels-studies indicate that the lower your LDL, the lower the risk of heart attack and stroke. Since higher doses and *high-intensity statins* reduce LDL cholesterol more than lower doses, the hypothesis has been that higher doses are better and should be used more liberally. And the new ACC/AHA guidelines recommend *high-intensity statins* if a person does not have any conditions or problems that prohibit their use.

But higher doses and *high-intensity statins* come with more side effects. Higher doses of all statins have been linked to muscle aches, soreness, tenderness, or weakness. Studies indicate that between one in 20 to one in 10 people who take a statin—regardless of dose—experience these symptoms, and up to 10 percent in some studies have not been able to tolerate an 80 mg dose.

Higher doses have also been linked to an increased risk of a life-threatening form of muscle breakdown called rhabdomyolysis. This can lead to permanent kidney damage, coma, and death.

So even if you fall into a category that should received a *high-intensity statin*, we advise caution and careful monitoring for the occurrence of side effects.

People with special considerations

Table 4 presents statin recommendations for peoplewho take medications for certain medical conditions. Ifyou have one of these conditions, you should discuss it

with your doctor so he or she can help you determine which statin is the safest and most effective for your situation.

In particular, medicines for HIV and AIDS and those used to prevent the rejection of transplanted organs can increase the toxicity of statins. Statins can also increase the effect of blood thinners, such as warfarin (Coumadin and generic), and can interact with many other medications, including those used to control blood pressure.

This is not a comprehensive list. Your doctor may advise a particular statin if you have other conditions or chronic diseases. It's wise to tell your doctor about any prescription or nonprescription medicine and dietary supplements you are taking, as well as any medical conditions you have. And you should always carefully read the labeling or package insert that comes with your medicine. It contains essential information about how to take the medication and side effects and drug interactions you should be aware of.

Splitting your statin pills

There is another way you can save money if you have to take a statin: Split your pills. As you can see from **Tables 2** and **3**, some statins cost more at higher doses but others cost the same. When larger doses cost the same as or less than the smaller dose, you can save a lot of money by asking your doctor to write a prescription for twice the intended dose, and then splitting the pills in half (See **Table 5** on page 16).

Several studies indicate that most statins can be split in half without any loss of effectiveness. Both

Table 4. Statin Choices for People with Special Considerations						
Condition or other drugs you may be taking	Frequently recommended statins ¹	Comment				
Kidney transplant patients taking cyclosporine	Fluvastatin (Lescol) Pravastatin (Pravachol and generic)	Both are safe and effective. Lescol is less proven than pravastatin.				
HIV positive patients taking protease inhibitors ²	Atorvastatin (Lipitor and generic) Fluvastatin (Lescol) Pravastatin (Pravachol and generic)	Low doses are strongly advised.				
Patients taking gemfibrozil (Lopid) (a type of cholesterol-lowering drug)	Atorvastatin (Lipitor and generic)	Gemfibrozil combined with a statin increases the risk of rhabodomyolysis, which can lead to kidney failure and death.				
Patients taking the blood thinner warfarin (Coumadin and generic)	All statins	May require adjustment in dose of warfarin.				

Table 4. Statin Choices for People With Special Considerations

1. Because they have been shown effective in this population of patients.

2. Protease inhibitors include indinivir, nelfinavir, ritonavir, saquinavir, amprenavir, and the combination drug lopinavir/ritonavir.

Table 5. Pill Splitting Could Save You Money						
Statin and daily dose	Average monthly cost ¹	Monthly savings if larger dose split in half ²	Resulting average monthly cost with split			
Atorvastatin (generic) 20 mg	\$100	\$47	\$53			
Atorvastatin (Lipitor) 20 mg	\$254	\$122	\$132			
Atorvastatin (Lipitor) 40 mg	\$264	\$133	\$131			
Rosuvastatin (Crestor) 5 mg	\$205	\$104	\$101			
Simvastatin (generic) 20 mg	\$71	\$37	\$34			

1. Prices reflect nationwide retail average for January 2014, rounded to nearest dollar. Information derived by *Consumer Reports Best Buy Drugs* from data provided by Symphony Health Solutions, which is not involved in our analysis or recommendations

2. Monthly savings-calculation is based on cost of pill that is twice the strength of pill strength indicated in first column. For example, cost savings for a 20 mg daily dose would be based on cost of 40 mg pill, which would be split in half, compared with cost of 20 mg pill.

government and private-sector health facilities (including the Veteran's Affairs health system) acceptand in some cases even encourage-this practice.

You should, however, consult your doctor before splitting your statin pills. Some people find pill splitting difficult to do.

If you and your doctor agree that you can split your pills, use a pill splitter to make certain that the two halves are the same size and therefore provide the correct dose each day. Pill splitter devices cost \$3 to \$10 and are widely available. A good practice is to split your pills one at a time and take the second half as your next dose. For a guide to safe and effective pill splitting, go to www.CRBestBuyDrugs.org.

How effective are statins?

Statins reduce the risk of a first heart attack and repeat heart attacks, as well as the risk of death from heart attacks and other forms of heart disease. But some have been studied more extensively than others in terms of both their effectiveness and their safety. And ongoing research continues to define how the statins work and how they differ.

Although all statins reduce LDL cholesterol levels, they have also been evaluated by three other criteria to determine if the drug:

- Reduces nonfatal heart attacks;
- Reduces deaths from heart attacks;
- Reduces the chance of death due to other causes, including stroke and other forms of heart disease.

Reduction of heart attacks

Four statins—atorvastatin (Lipitor and generic), lovastatin (Altoprev, Mevacor, and generic), pravastatin (Pravachol and generic), and simvastatin (Zocor and generic)—have been proven to reduce the risk of heart attack over three to five years of use. And rosuvastatin (Crestor) has been shown to reduce the risk of heart attack over 1.9 years of use. But you should know that the longest studies have only looked at several years of use and no studies have looked at the impact of taking these drugs for 20 to 30 years or longer, the length of time that many people will wind up taking the medicines.

Fluvastatin (Lescol and Lescol XL) and pitavastatin (Livalo) have not been shown to prevent heart attacks and strokes. So we can't recommend either one.

It's important to note that although statins reduce the risk of a first or a repeat heart attack, they do not completely eliminate the possibility of these conditions. In one three-year study that looked at preventing a first heart attack, 5 percent of people who took a placebo had a heart attack compared to 3 percent of those who took a statin. And another recent study found that while people who did not have cardiovascular disease, but did have one or more risk factors (and/or diabetes), benefitted from taking a statin, the reduction in risk was not dramatic. Of those taking statins, 6 percent had a heart attack, coronary event, or stroke versus 8 percent of those taking a placebo.

Reduction of deaths

Four statins—atorvastatin (Lipitor and generic); lovastatin (Altoprev, Mevacor, and generic); pravastatin (Pravachol and generic); and simvastatin (Zocor and generic)—have been found to reduce deaths from heart attacks among patients with a history of heart disease or risk factors for heart disease, such as diabetes and high blood pressure.

In addition, two of the statins-pravastatin and simvastatin-have been found to reduce the overall risk of dying among people considered to be at low risk of heart disease or heart attack. A major study of lovastatin has strongly suggested a similar benefit. Atorvastatin has only been tested—and found to be effective—in reducing deaths in high-risk patients. But here, too, the evidence strongly suggests that it would be effective in reducing deaths among low-risk people as well.

One trial, called JUPITER, showed that rosuvastatin (Crestor) reduced the risk of heart attacks and death in people considered to be at low risk of heart disease or heart attack. While a decrease in heart attack, stroke and death is good news, the actual reduction was quite small. The rate of these conditions dropped from about 2.8 percent in the placebo group to 1.6 percent in those who took Crestor. In addition, the JUPITER trial was stopped early after 1.9 years. Longer trials are needed to confirm the results.

For people who have had a heart attack

Starting a statin at the time of a heart attack or very soon after can reduce the risk of death substantially treatment that is fast becoming routine. In an important head-to-head study of people who had a heart attack, a high dose of atorvastatin (Lipitor 80 mg) proved to be more effective in reducing the rate of premature death than a moderate dose of pravastatin (40 mg). In a second recent study, 80 mg of Lipitor reduced nonfatal heart attacks more than a 20 mg dose of simvastatin, but there was no significant difference in the number of deaths among people who took the two different drugs and doses.

How safe are statins?

Overall, statins appear to be quite safe. But they can have two important adverse effects: muscle tissue damage and liver damage. We discuss those safety concerns in more detail below.

Statins also pose a small risk of type 2 diabetes. The FDA added that risk to the labeling of all statins in 2012 after reviewing several studies that had found an increased risk of elevated blood sugar levels and diabetes in people who took the medications. For example, an analysis of 13 studies published in the journal Lancet in February 2010 found a 9 percent increased risk of diabetes in people who used statins. Or looked at another way, there would be one extra case of diabetes for every 255 people who took a statin for four years.

The FDA says statins can also cause memory loss, forgetfulness, and confusion. The FDA, which added this risk to the labeling of statins in February 2012, said studies and reports it has received indicate there have been rare cases of people who developed memory loss or impairment after taking the medications. Some people developed memory problems one day after taking a statin while others did not experience any problems until they had been taking a statin for years. The problems did not appear to be linked to higher doses of statins. The memory problems, which occurred in people over the age of 50, went away when the statin was stopped. In addition, as we previously noted, the long-term effects of taking statins for decades has not been assessed. So while these drugs appear to be relatively safe over several years of use, it's uncertain if taking the medicines for 20 to 30 years or longer raises any unique concerns.

Because of the risk for birth defects, women who are pregnant or trying to become pregnant should not take any statin drug. Women who are breast feeding should not take a statin as well.

Muscle tissue damage

As we've previously noted, statins can cause muscle aches, soreness, tenderness, or weakness in up to 5 to 10 percent of people taking them. This includes people taking lower doses, although low doses (10 mg and 20 mg) are much less likely to cause problems.

The symptoms of muscle problems include unexplained muscle weakness or pain, feeling very tired even though you've slept well, nausea and vomiting, stomach pain, and brown- or dark-colored urine. *Consult your doctor immediately if you begin to have any of those symptoms*. These symptoms usually go away within days or weeks after you stop taking the drug. But they could be signs of a rare, life-threatening form of muscle breakdown called *rhabdomyolysis*. This can lead to permanent kidney damage and coma. One statin, cerivastatin (Baycol), was withdrawn from the U.S. market in 2001 because it caused several deaths due to rhabdomyolysis.

Larger doses of statins raise the risk of muscle aches, weakening, and rhabdomyolysis, as discussed below in *Differences among statins* section.

Taking a statin in combination with certain other drugs (gemfibrozil, niacin, and verapamil; check with your doctors for a list of others) can also significantly increase the risk of muscle damage and rhabdomyolysis. For the same reason, several additional drugs should not be taken with simvastatin, including:

- certain antibiotics (erythromycin, clarithromycin, telithromycin)
- certain anti-fungal medications (itraconazole, ketoconazole, posaconazole)
- cyclosporine, an immunosuppressant
- danazol (used to treat endometriosis)
- HIV protease inhibitors
- nefazodone, an antidepressant

Doses of simvastatin greater than 20 mg per day increase the risk of rhabdomyolysis when used in combination with amiodarone, a drug for treating an irregular heartbeat, amlodipine (used to treat high blood pressure), and ranolazine (used to treat angina).

The cholesterol-lowering drug ezetimibe (Zetia) has been associated with muscle aches and rhabdomyolysis when used on its own and in combination with statins.

Other factors that increase the risk of rhabdomyolysis include alcoholism, low phosphate levels, extreme exercise (such as running a marathon), and the use of illegal drugs, like cocaine, heroin, and PCP.

Liver problems

Liver problems while taking a statin are uncommon, and when it occurs it's usually mild. Nevertheless, the FDA advises patients prescribed a statin to have liver function tests before starting treatment. Contact your doctor immediately if you develop signs of liver problems, which include unusual fatigue or weakness, loss of appetite, dark-colored urine, or your skin or whites of your eyes begin to turn yellow.

Differences among statins

Overall, statins at low doses do not differ with respect to the risks of these adverse effects. Generally, people taking low doses of statins are at very low risk of muscle or liver problems. But studies in recent years have raised concerns about muscle damage associated with high doses of some of the statins. The largest study of the safety of a statin followed 8,245 people who took generic lovastatin in doses of 20 mg, 40 mg, or 80 mg for four years. The incidence of muscle and liver problems increased with increasing doses.

The available evidence indicates the highest dose of simvastatin—80 mg—poses an increased risk of muscle problems and rhabdomyolysis, so the FDA recommends that the 80 mg tablet not be used except in people who have already been taking it without problems for a year or longer.

Most experts think-and the evidence so far strongly suggests-that all the statins have the potential to cause muscle problems at high doses. But until definitive studies are done, it is not clear whether some statins now on the market may pose more of a risk than others.

Finally, studies have found that grapefruit juice can enhance the absorption of statin drugs. While no studies have found any ill effects from this, in theory it could increase the potential for muscle and liver problems, or other minor side effects. If you are taking a statin and enjoy grapefruit juice, talk with your doctor.

Age, race, and gender differences

Women, people over age 65, and members of various ethnic groups have been under-represented in the major studies of statins. But one review of the studies suggests that the drugs are equally effective and safe in men, women, and people over age 65.

The benefits of statins are uncertain, however, in women who have very marginally elevated LDL and do not already have heart disease or other risk factors. We advise women who fall into this category to discuss this issue with their doctor. In addition to your LDL level, the discussion should also focus on your overall heart disease risk, based on whether you have other risk factors (age 55 or older, diabetes, family history of heart disease, high blood pressure, lack of exercise, overweight or obese, smoker). Bear in mind that at any particular age and LDL level, women generally have a much lower risk of heart disease than men. So if your risk is low and your doctor suggests a statin, you should ask whether it's really necessary at this point in your life.

And as we have previously stated, women who are pregnant, trying to become pregnant, or breastfeeding should not take any statin drug.

If you are of Asian heritage (Filipino, Chinese, Japanese, Korean, Vietnamese, or Asian-Indian), you should know that the labeling for rosuvastatin (Crestor) notes that studies have found levels of the drug that were twice as high in Asian people compared with Caucasians. The labeling advises that the dosage of the drug be adjusted accordingly for Asian people. Some advise that people of Asian heritage begin initially with a 5 mg dose.

5 Tips to talking with your doctor

It's important for you to know that the information we present here is not meant to substitute for a doctor's judgment. But we hope it will help you and your doctor arrive at a decision about which statin and dose is best for you, if one is warranted at all, and which gives you the most value for your health-care dollar.

Mention cost to your doctor.

Bear in mind that many people are reluctant to discuss the cost of medicines with their doctor, and that studies have found that doctors do not routinely take price into account when prescribing medicines. Unless you bring it up, your doctor may assume that cost is not a factor for you.

Ask about older medications.

Many people (including physicians) think that newer drugs are better. While that's a natural assumption to make, it's not always true. Studies consistently find that many older medicines are as good as, and in some cases better than, newer medicines. Think of them as "tried and true," particularly when it comes to their safety record. Newer drugs have not yet met the test of time, and unexpected problems can and do crop up once they hit the market. Of course, some newer prescription drugs are indeed more effective and safer. Talk with your doctor about newer vs. older medicines, including generic drugs.

O Consider generic drugs.

Prescription medicines go "generic" when a company's patents on them have lapsed, usually after about 12 to 15 years. At that point, other companies can make and sell the drugs. Generics are much less

expensive than newer brand-name medicines, but they are not lesser quality drugs. Indeed, most generics remain useful medicines even many years after first being marketed. That is why more than 75 percent of all prescriptions in the U.S. today are written for generics.

Keep up-to-date records.

Another important issue to talk with your doctor about is keeping a record of the drugs you take. There are several reasons for this:

- First, if you see several doctors, each may not be aware of medicines the others have prescribed.
- Second, since people differ in their response to medications, it's common for doctors today to prescribe several medicines before finding one that works well or best.
- Third, many people take several prescription medications, nonprescription drugs, and dietary supplements at the same time. They can interact in ways that can either reduce the benefit you get from the drug or be dangerous.
- Fourth, the names of prescription drugs—both generic and brand—are often hard to pronounce and remember.

For all these reasons, it's important to keep a written list of all the drugs and supplements you take and periodically review it with your doctors.

5. Know the facts. Finally, always be sure that you understand the dose of the medicine being prescribed and how many pills you are expected to take each day. Your doctor should tell you this information. When you fill a prescription at a pharmacy, or if you get it by mail, check to see that the dose and the number of pills per day on the bottle match the amounts your doctor told you.

How we picked the Best Buy drugs

Our evaluation is based in part on an independent scientific review of the studies and research literature on statin drugs conducted by a team of physicians and researchers at the Pacific Northwest Evidence-Based Practice Center. This analysis reviewed 347 studies, including 225 clinical trials, 80 observational studies, and 21 systematic reviews. The analysis also included studies conducted by the drugs' manufacturers. This effort was conducted as part of the Drug Effectiveness Review Project, or DERP. DERP is a first-of-its-kind, multi-state initiative to evaluate the comparative effectiveness and safety of hundreds of prescription drugs.

The full DERP review of statins is available at http:// www.ncbi.nlm.nih.gov/books/NBK47273/. (Note: This is a long and technical document written for physicians.) This update of our previous statin report also relied on a recent review of combination therapies conducted for the Agency for Healthcare and Research (AHRQ) Effective Healthcare Program.

The monthly costs we cite were obtained from a health-care information company that tracks the sales of prescription drugs in the U.S. Prices for a drug can vary quite widely. All the prices in this report are national averages based on sales in retail outlets. They reflect the cash price paid for a month's supply of each drug in January 2014.

Consumer Reports selected the *Best Buy* Drugs using the following criteria. The drug had to:

- Be in the top tier of effectiveness among the seven statins
- Have a safety record equal to or better than other statins
- Have an average price for a 30-day supply that is lower than the most costly statin meeting the first two criteria

The *Consumer Reports Best Buy Drugs* methodology is described in more detail in the Methods section at www.CRBestBuyDrugs.org.



About us

Consumer Reports is an independent and nonprofit organization whose mission since 1936 has been to provide consumers with unbiased information on goods and services and to create a fair marketplace. Its website is www.ConsumerReports.org.

Consumer Reports Best Buy Drugs is a publiceducation project administered by Consumers Union. These materials were made possible by the state Attorney General Consumer and Prescriber Education Grant Program, which is funded by a multistate settlement of consumer-fraud claims regarding the marketing of the prescription drug Neurontin.

The Engelberg foundation provided a major grant to fund the creation of the project from 2004 to 2007. Additional initial funding came from the National Library of Medicine, part of the National Institutes of Health. A more detailed explanation of the project is available at www.CRBestBuyDrugs.org. We followed a rigorous editorial process to ensure that the information in this report and on the *Consumer Reports Best Buy Drugs* website is accurate and describes generally accepted clinical practices. If we find an error or are alerted to one, we will correct it as quickly as possible. But Consumer Reports and its authors, editors, publishers, licensers, and suppliers cannot be responsible for medical errors or omissions, or any consequences from the use of the information on this site. Please refer to our user agreement at www.CRBestBuyDrugs.org for further information.

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